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EXAMINER				
RUTTEN, JAMES D				
ART UNIT		PAPER NUMBER		
2192				
NOTIFICATION DATE		DELIVERY MODE		
10/15/2008		ELECTRONIC		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary

Application No.

10/782,080

Applicant(s)

HITCHCOCK ET AL.

Examiner

JAMES RUTTEN

Art Unit

2192

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 June 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-946)
- 3) ☐ Information Disclosure Statement(s) (PTO/SF/ICE)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

1. This action is in response to Applicant's submission filed 6/10/08, responding to the 3/20/08 Office action which detailed the rejection of claims 1-20. Claims 1 and 11 have been amended. Claims 1-20 remain pending in the application and have been fully considered by the examiner.

Response to Arguments/Amendments

2. Applicant's arguments filed 6/10/08 have been fully considered but they are not persuasive.

In section II on pages 8-9 filed 6/10/08, Applicants essentially argue that "the invention as presently claimed, abstracts directly from a hierarchical register consolidation structure and not from a set of device drivers as taught and suggested by Nelson." Review of Nelson shows that the data structure depicted in Fig. 1A is called an "Interrupt Source Tree (IST)" (see column 2 lines 51-53). Nelson column 3 lines 9-15 describes the IST as enabling interrupt dispatching to be removed from device drivers, and that each level of the tree represents a characterization of a device. As such, the IST is not an abstraction of a device driver, as seemingly suggested by Applicants. Rather, as further described by Nelson in column 3 lines 34-38, code in a node of the IST obtains values directly from registers, not drivers. This description appears to coincide with the newly amended claim language such that values obtained from registers are interpreted as being abstracted status indicators as indicated in the claim rejections below. Therefore, Applicants' arguments are not persuasive.

Further arguments on pages 9-10 are based on previous arguments as addressed above, and are not persuasive for the same reasons.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claim 1-3, 5-9, 11-13, and 15-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 5,568,644 to Nelson et al. (hereinafter "Nelson") in view of U.S. Patent 5,371,742 to Brown et al. ("Brown").

In regard to claim 1, Nelson discloses:

A computer-implemented condition management callback system embodied in a computer-readable media (see Fig. 2, also column 4 lines 47-49, e.g. "storage medium for the IST and ISRs") for use with a processor employing a <> register <> structure (see column 3 lines 31-44, e.g. "register"), comprising:

a condition management data structure, separate from said <> register <> structure, containing groups of status indicators logically abstracted directly from said <> register <> structure into a tree of hierarchical container objects and element objects, each of said container objects associated with at least one of said element objects and linked to a single parent object, See the "Interrupt Status Indicator (IST)" of

Fig. 1A., also column 3 lines 9-15, e.g. "hierarchical tree." Also see column 3 lines 31-44, e.g. "register." Nelson describes a hierarchical abstraction of a register structure used for managing interrupts. Also see column 1 lines 51-59. Further description by Nelson in column 3 lines 34-38 describe how code in a node of the IST obtains a value from a register structure:

For example at one node, code is executed to read a certain register. The value stored in the identified **register** may indicate a device from a certain class of devices issued the interrupt. The path taken down to the next level is determined from **the value**.

Thus, the node abstracts the value as a status indicator, which is obtained directed from a register structure.

each of said element objects representing at least one of said status indicators and linked to a single child object; Fig. 1A illustrates that each element is associated with a single set, or collection, of element objects. Further, see column 3 lines 44-51.

a callback abstraction subsystem configured to register a callback for one of said element objects and store logically abstracted data associated with said callback; and
See column 3 lines 56-59, e.g. "handler ISR."

an abstraction retrieval subsystem configured to employ said condition management structure to determine a condition of at least one of said status indicators by traversing said hierarchical register consolidation structure, See column 4 line 66 – column 5 line 2, e.g. "interrupt engine begins processing."

initiate said callback based on said condition and pass said logically abstracted data if said one of said element objects representing said at least one of said status indicators has said callback registered. See column 3 lines 60-61, e.g. "handler ISR is invoked."

Nelson does not expressly disclose: a *hierarchical register consolidation* structure. However, Brown discloses a hierarchical register consolidation structure. See Fig. 2 and column 2 lines 55-56, e.g. "interrupt registers 28 arranged in a hierarchal relationship." It would have been obvious to one of ordinary skill in the art at the time the invention was made to use Brown's hierarchical register consolidation structure with Nelson's condition management structure in order to provide efficient error handling as suggested by Brown (see column 2 lines 16-18).

In regard to claim 2, the above rejection of claim 1 is incorporated. Nelson further discloses: *wherein said callback abstraction subsystem is further configured to register said callback for at least one of said container objects*. See column 3 lines 58-59.

In regard to claim 3, the above rejection of claim 2 is incorporated. Nelson further discloses: *wherein said abstraction retrieval subsystem is further configured to initiate said callback based on said element objects associated with said at least one of said container objects and pass said logically abstracted data*. See column 3 lines 35-43.

In regard to claim 5, the above rejection of claim 1 is incorporated. Nelson does not expressly disclose: *wherein said hierarchical register consolidation structure is a hierarchical interrupt register structure of said processor and said status indicators are interrupt bits of registers within said hierarchical register consolidation structure*. However, Brown teaches that interrupt registers are used to hold status indicators as

interrupt bits. See Figs. 2 and 3. It would have been obvious to one of ordinary skill at the time the invention was made, to use Brown's interrupt registers with Nelson's hierarchical register consolidation structure in order in order to provide efficient error handling as suggested by Brown (see column 2 lines 16-18).

In regard to claim 6, the above rejection of claim 5 is incorporated. Nelson further discloses: *wherein said logically abstracted data contains information related to a type of interrupt*. See column 4 lines 19-22.

In regard to claim 7, the above rejection of claim 1 is incorporated. Nelson further discloses: *wherein said callback includes a function pointer, an application data pointer and a callback state*. See column 3 lines 46, 61-64, and column 4 lines 3-5.

In regard to claim 8, the above rejection of claim 1 is incorporated. Nelson further discloses: *wherein said callback includes control information for automatic enabling and disabling of said callback*. See column 4 lines 14-22.

In regard to claim 9, the above rejection of claim 1 is incorporated. Nelson further discloses: *wherein said callback abstraction subsystem is further configured to set an auto-disable flag associated with said callback and said abstraction retrieval subsystem is further configured to employ said auto-disable flag to cause said callback to be disabled from being initiated again after a first initiation*. See column 4 lines 25-28.

In regard to claim 11, Nelson discloses a method. See column 2 lines 57-59, e.g. “steps.” All further limitations have been addressed in the above rejection of claim 1.

In regard to claims 12, 13, and 15-19, the above rejection of claim 11 is incorporated. All further limitations have been addressed in the above rejections of claim 2, 3, and 5-9, respectively.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 4 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nelson and Brown as applied to claims 1 and 11 above, and further in view of U.S. Patent 5,805,889 to Van De Vanter (hereinafter “Van De Vanter”).

In regard to claim 4, the above rejection of claim 1 is incorporated. Nelson further discloses: *wherein said logically abstracted data is a ...message*. See column 5 lines 22-25. Nelson and Brown do not expressly disclose: *a text message*. However, Van DeVanter teaches that text messages are passed in the form of string arguments. See column 10 lines 65-67. It would have been obvious to one of ordinary skill at the time

the invention was made, to use Van De Vanter's teaching of a string argument with Nelson's message in order to provide notification of the handler's name as suggested by Van De Vanter.

In regard to claim 14, the above rejection of claim 11 is incorporated. All further limitations have been addressed in the above rejection of claim 4.

7. Claims 10 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nelson and Brown as applied to claims 1 and 11 above, and further in view of U.S. Patent 4,768,149 to Konopik et al. (hereinafter "Konopik").

In regard to claim 10, the above rejection of claim 1 is incorporated. Nelson and Brown do not expressly disclose: *wherein said callback abstraction subsystem is further configured to register multiple callbacks for said one of said element objects and store logically abstracted data for each of said callbacks*. However, Konopik teaches shared interrupts by multiple handlers that are registered to service a single interrupt using stored data. See column 6 lines 56-64. It would have been obvious to one of ordinary skill at the time the invention was made, to use Konopik's teaching of shared interrupts with Nelson's interrupt handlers in order to share a common interrupt line among a plurality of devices as suggested by Konopik (see column 5 lines 54-57).

In regard to claim 20, the above rejection of claim 11 is incorporated. All further limitations have been addressed in the above rejection of claim 10.

Conclusion

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to JAMES RUTTEN whose telephone number is (571)272-3703. The examiner can normally be reached on M-F 9:00-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tuan Q. Dam can be reached on (571)272-3695. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/J. R./
Examiner, Art Unit 2192

/Tuan Q. Dam/
Supervisory Patent Examiner, Art Unit 2192